James Acker:
Hi all. Getting ready to get started in just a couple of minutes

Our first presenter for the afternoon is Rachel Pinker of the University of Maryland,
speaking on the Use of MODIS data for inferring Radiative Fluxes and Applications.

Rachel Pinker:
Last time I saw Gregory at a Conference in Europe.
An event in his memory would have seemed unimaginable at that time.
We are grateful to Gregory for helping make Giovanni a great resource.

Slide 2: Will discuss both shortwave and longwave radiative fluxes

Slide 3: Since the audience has a wide range of interests, will provide some background information.

Slide 4: Clouds control the radiation budget.

Slide 5: Need auxiliary information on state of the atmosphere that comes usually from independent sources.

Slide 6: Derive information on aerosols and surface albedo from clear sky radiances (can use aerosols from
independent sources) and information on cloud optical depth from the cloudy radiances. Requires transformation
to broadband values from spectral observations. The various steps involved are not trivial.
ISCCP D1/DX are two formats (D1 and DX) of the International Satellite Cloud Climatology Project.

Slide 10: ISCCP stand for International Satellite Cloud Climatology Project established around 1983.
The most widely used producst are observations gridded at about 2.50 at 3-hourly intervals and known as ISCCP D1. A higher resolution product also exits-pixel level sampled at about 30 km known as ISCCP DX.

Geostationary satellites:
Ideally, six geostationary satellites should cover the globe up to 500 N and S.
The satellites differ in sensors, delivery of data, calibration, spatial resolution.
Need to supplement with polar orbiters. The ISCCP effort to put it all together was monumental and provided first of its kind information on radiative fluxes at global scales. The most frequent product is at 2.50 at 3-hourly time scale.

Most satellite retrievals are doing well when evaluated against ground truth as available from the Baseline Surface Radiation Network (BSRN).

Slide 11. University of Maryland/Shortwave Radiation Budget model (UMD/SRB). The latest version is labeled v3.3.3. It provides information at 0.50 resolution. Other model results used in comparison are from GISS known as ISCCP-FD, from NASA/LaRC known as GEWEX/SRB and from NASA/LaRC known as CERES (CERES-SRBAVG-Terra-GEO-MOD_Ed02d as obtained from the Radiative Flux
Assessment (RFA) web site. Ground truth is from the Baseline Surface Radiation Network (BSRN).

Slide 15. All satellite models evaluated (most commonly used) have problems over oceans (overestimation

Slide 19. Results were much better than previous estimates over oceans.

Slide 20. Since high latitudes are most problematic, an effort was made to use observations from various experiments over the oceans at such locations.

Slide 21: Consequently, WHOI cleaned the observations

Slide 22: evaluation against PIRATA buoys shows best agreement with MOI product. Figure (c) shows that
it is possible to use the MODIS product to remove bias, in this case done for case (b).

Slide 23: Modis observations, in particular, the 5-km have a great potential for high latitude due to floats etc.

A problem with the table. It does not show the info on sources of spectral reflectance used in improved model.

The ARM data for the North Slope of Alaska are of high quality and provide all fluxes. Grat for evaluation of
long term satellite estimates. The agreemnt with surface albedo was kind of surprising.

Slide 26:
Unique long term data set from Barrow, Alaska ARM Program described in:
Dong, X., B. Xi, K. Crosby, C. N. Long, R. S. Stone, and M. D.
Shupe, 2010: A 10 year climatology of Arctic cloud fraction
and radiative forcing at Barrow, Alaska. J. Geophys. Res., 115,
D17212, doi:10.1029/2009JD013489.

The measurements include SW and LW components up and down (can compute albedo)
and independent net radiative fluxes

Unfortunately, not enough observations at high latitudes for evaluation.

Time permitting will explain 28 and 29.

Developed LW for MODIS. (problem with slide)

use MODIS and A-Train

model developed for clear sky good agreement with the RRTM model.

A-Train helped in improving estimates of cloud base.

Comparison of LW from MODIS looks good compared to numerical models and other satellite products.

Not all regions included in previous studies have a negative anomaly.

Examples how results are used to address relevant issues.

The MODIS NPP algorithm uses shortwave radiation from GMAO and a constant factor to get PAR.

Thank you.

James Acker:
Rachel, thank you! That was a great start for our workshop - lots of use of MODIS data and a direct relationship to current issues with sea ice. Your presentation will be online soon.

James Acker:
Questions, can be sent to Dr. Pinker by email